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## Product Information

### Water Molecular Biology Reagent

Catalog Number **W 4502**  
Store at Room Temperature

CAS Number: 7732-18-5

Molecular Formula: H<sub>2</sub>O  
Molecular Weight: 18.02

**Product Description** This product is 0.1 µm filtered. It is designated as a Molecular Biology Reagent and is suitable for molecular biology applications. This product has been analyzed for the absence of nucleases and proteases, and has undergone bioburden analysis. It has not been treated with diethyl pyrocarbonate (DEPC).

The use of water that is free of nucleases and proteases is important for the investigation of nucleic acid and protein systems. In proteomics research, for example, one such study involves the microarray deposition of water for analysis of protease mixtures, protease-substrate interactions, and high-throughput screening reactions with caspases.<sup>1</sup> Other potential applications can include the use of water in a water/alcohol washing step for a microchip-based solid-phase extraction protocol for nucleic acid isolation.<sup>2</sup>

Water is the most fundamental and universal solvent known in nature. Both the polar character and the hydrogen bonding capability of water contribute to its unique solvent properties. Polar materials dissolve in water readily. In the case of salts, water can readily overcome the electrostatic attractions between cations and anions in the solid lattice. In the case of amphipathic molecules, which contain both polar and nonpolar groups, water will dissolve such molecules if the attraction of the polar portion for water exceeds the hydrophobic interactions of the nonpolar groups.<sup>3,4</sup>

On average, in a biological cell, water constitutes 70% of the total cell mass. Among its other roles in biology, water participates in photosynthesis in plants and cyanobacteria by acting as an electron donor for a

manganese-containing water splitting enzyme in photosystem II.<sup>5</sup> A review of photosystem II and the role of water in its function has been published.<sup>6</sup> The role of water in enzymatic processes has been reviewed.<sup>7</sup>

### Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

It is not recommended to autoclave the bottles in which this product is packaged.

### References

1. Gosalia, D. N., and Diamond, S. L., Printing chemical libraries on microarrays for fluid phase nanoliter reactions. *Proc. Natl. Acad. Sci. USA*, **100**, 8721-8726 (2003).
2. Wolfe, K. A., et al., Toward a microchip-based solid-phase extraction method for isolation of nucleic acids. *Electrophoresis*, **23**, 727-733 (2002).
3. *Biochemistry*, 3rd ed., Stryer, L., W. H. Freeman (New York, NY: 1988), pp. 9-11.
4. *Textbook of Biochemistry with Clinical Correlations*, 5th ed., Devlin, T. M., ed., Wiley-Liss (New York, NY: 2002), pp. 6-9.
5. *Molecular Biology of the Cell*, 3rd ed., Alberts, B. A., et al., Garland Publishing (New York, NY:1994), pp. 89, 693.
6. Barber, J., Photosystem II: the engine of life. *Q. Rev. Biophys.*, **36**, 71-89 (2003).
7. Pocker, Y., et al., Water in enzyme reactions: biophysical aspects of hydration-dehydration processes. *Cell. Mol. Life Sci.*, **57**, 1008-1017 (2000).

PH,PHC 08/06-1

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